Symbol DS9808-R

Product Reference Guide Supplement

Symbol DS9808-R
Product Reference Guide Supplement

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Warranty

For the complete Motorola hardware product warranty statement, go to:
http://www.motorola.com/enterprisemobility/warranty.

Revision History

Changes to the original manual are listed below:

Change	Date	Description
-01 Rev A	4/2010	Initial release

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Tell Us What You Think...

About This Guide

Introduction

The *Symbol DS9808-R Product Reference Guide Supplement* provides the unique reading and programming procedures for the DS9808-R (DS9808 with RFID) digital scanner. This guide is intended as a supplement to the *Symbol DS9808 Product Reference Guide*, p/n 72E-112999-xx. For information and procedures common to the DS9808 series of products, refer to the *Product Reference Guide*.

Configurations

This guide addresses the following DS9808-R configurations.

Configuration	Scan Range	DL Parsing	RFID	Availability
DS9808-SR00007C1WR	Standard	No	902 – 928 Mhz	United States
DS9808-SR00007C2WR	Standard	No	902 – 928 Mhz	Canada, Mexico
DS9808-DL00007C1WR	Standard	Yes	902 – 928 Mhz	United States
DS9808-LR20007C1WR	Long	No	902 – 928 Mhz	United States
DS9808-LR20007C2WR	Long	No	902 – 928 Mhz	Canada, Mexico
DS9808-LL20007C1WR	Long	Yes	902 – 928 Mhz	United States

Availability

The DS9808-R is only available for the countries listed below.

NOTE This list may be updated if other countries are added. Check with your local Motorola sales representative for the latest information on availability in your country.

Configuration	Countries Supported
DS9808-SR00007C1WR	United States
DS9808-SR00007C2WR	Canada, Mexico
DS9808-DL00007C1WR	United States
DS9808-LR20007C1WR	United States
DS9808-LR20007C2WR	Canada, Mexico
DS9808-LL20007C1WR	United States

Upgrading a DS9808 to DS9808-R

DS9808 customers in countries listed above can upgrade certain DS9808 models to DS9808-R. Motorola's repair centers perform the upgrades, ensuring like-new factory performance. Contact Motorola Enterprise Mobility Support at (800) 653-5350 for upgrade pricing and instructions.

The following DS9808 models can be upgraded to DS9808-R:

DS9808 Model	Can be upgraded to:
DS9808-LR20007CRWR	DS9808-LR20007C1WR, DS9808-LR20007C2WR
DS9808-LL20007CRWR	DS9808-LL20007C1WR

Review the following differences between the DS9808 and the DS9808-R before deciding to upgrade.

Feature	DS9808	DS9808-R
Multiple Interfaces Supported	USB, RS-232, RS-485 (port 9b, 5b, and 17b), keyboard wedge	USB, RS-232, RS-485 (port 9b and 5b). No keyboard wedge support.
Optional DC Power Supply	5 VDC power supply required for RS-232 and keyboard wedge only	12 VDC power supply required for USB (series A only), RS-232, and RS-485 (port 5b only)
Wall Mount Bracket	Supported	Not supported
Checkpoint EAS	EAS optional	EAS not supported

Chapter Descriptions

Topics covered in this guide are as follows:

- *Chapter 1, Getting Started* provides a product overview, unpacking instructions, and cable connection information.
- *Chapter 2, Data Capture* describes parts of the RFID digital scanner, beeper and LED definitions, and how to use the scanner to read tags.
- *Chapter 3, RFID Preferences* describes RFID preference features and provides programming bar codes for selecting these features.
- *Chapter 4, SSI Interface* describes how to set up the RFID digital scanner with a Simple Serial Interface (SSI) host.
- Chapter 5, Advanced Data Formatting briefly describes ADF, a means of customizing data before transmission to the host device, and includes a reference to the *ADF Programmer Guide*.
- *Chapter 6, Maintenance & Technical Specifications* provides information on how to care for the RFID digital scanner, troubleshooting, and technical specifications.
- Appendix A, Numeric Bar Codes includes the numeric bar codes to scan for parameters requiring specific numeric values.

Notational Conventions

The following conventions are used in this document:

- *Italics* are used to highlight the following:
  - Chapters and sections in this and related documents
  - Dialog box, window and screen names
  - Drop-down list and list box names
  - Check box and radio button names
- **Bold** text is used to highlight the following:
  - Key names on a keypad
  - Button names on a screen.
- bullets (•) indicate:
  - Action items
  - Lists of alternatives
  - Lists of required steps that are not necessarily sequential
- Sequential lists (e.g., those that describe step-by-step procedures) appear as numbered lists.
- Throughout the programming bar code menus, asterisks (*) are used to denote default parameter settings.

Related Documents

- *Symbol DS9808 Product Reference Guide*, p/n 72E-112999-xx - provides detailed setup and programming information for the Symbol DS9808 digital scanner.
- *Symbol DS9808-R Quick Start Guide*, p/n 72-125703-xx - provides general information for getting started with the Symbol DS9808-R digital scanner, and includes basic set up and operation instructions.
- *Advanced Data Formatting Programmer Guide*, p/n 72E-69680-xx - provides information on ADF, a means of customizing data before transmission to a host.

For the latest version of this guide and all Symbol guides, go to:
http://www.motorola.com/enterprisemobility/manuals.

Service Information

If you have a problem with your equipment, contact Motorola Enterprise Mobility support for your region. Contact information is available at: http://www.motorola.com/enterprisemobility/contactsupport.

When contacting Enterprise Mobility support, please have the following information available:

- Serial number of the unit
- Model number or product name
- Software type and version number

Motorola responds to calls by e-mail, telephone or fax within the time limits set forth in service agreements.

If your problem cannot be solved by Motorola Enterprise Mobility Support, you may need to return your equipment for servicing and will be given specific directions. Motorola is not responsible for any damages incurred during shipment if the approved shipping container is not used. Shipping the units improperly can possibly void the warranty.

If you purchased your Enterprise Mobility business product from a Motorola business partner, please contact that business partner for support.

Chapter 1 Getting Started

Introduction

The Symbol DS9808-R digital scanner combines 1D and 2D bar code scanning and superior RFID tag reading and transfer with a light-weight, hands-free/hand-held design. The digital scanner's built-in stand seamlessly accommodates both counter-top and hand-held use. Whether in hands-free (presentation) or hand-held mode, the digital scanner ensures comfort and ease of use for extended periods of time.

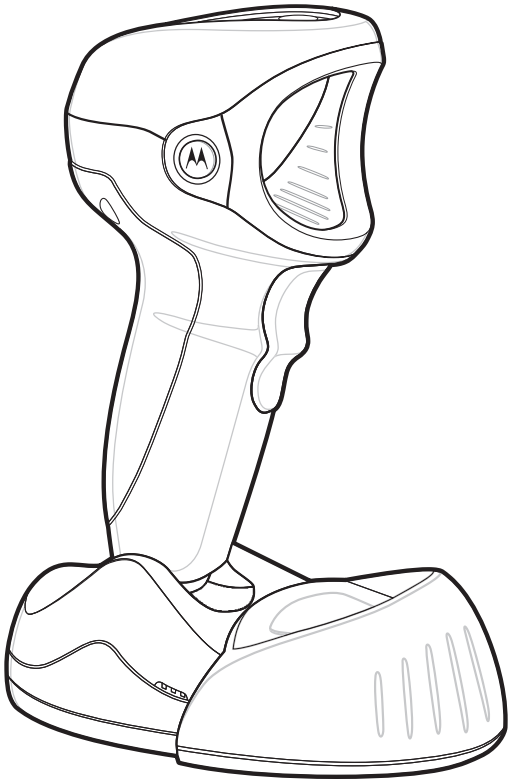


Figure 1-1 *Symbol DS9808-R Digital Scanner*

Unpacking

Remove the digital scanner from its packing and inspect it for damage. If the scanner was damaged in transit, contact Motorola Enterprise Mobility Support. See *page xi* for contact information. **KEEP THE PACKING**. It is the approved shipping container; use this to return the equipment for servicing.

Interfaces

The DS9808-R digital scanner supports the following interfaces. Refer to the *Symbol DS9808 Product Reference Guide* for more information.

- USB
- Standard RS-232
- IBM 468X/469X
- Simple Serial Interface (SSI) (RFID configuration only)

Setting Up the Digital Scanner

Connecting the Interface Cable

NOTE Different interfaces require different cables. The connectors illustrated in the following sections are examples only. Connectors vary from those illustrated, but the steps to connect the digital scanner are the same.

1. Plug the interface cable modular connector into the cable interface port on the bottom of the digital scanner's base.

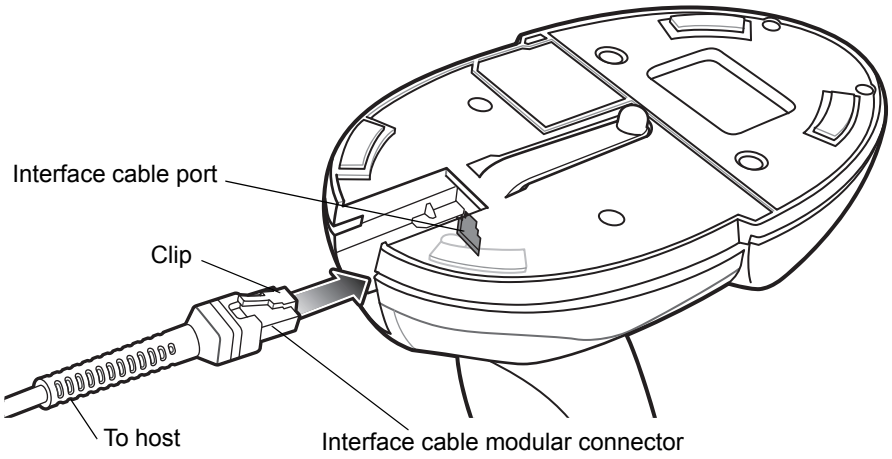


Figure 1-2 *Installing the Interface Cable*

2. Gently tug the cable to ensure the connector is secure.

Removing the Interface Cable

1. Press the cable's modular connector clip through the access slot in the digital scanner's base.

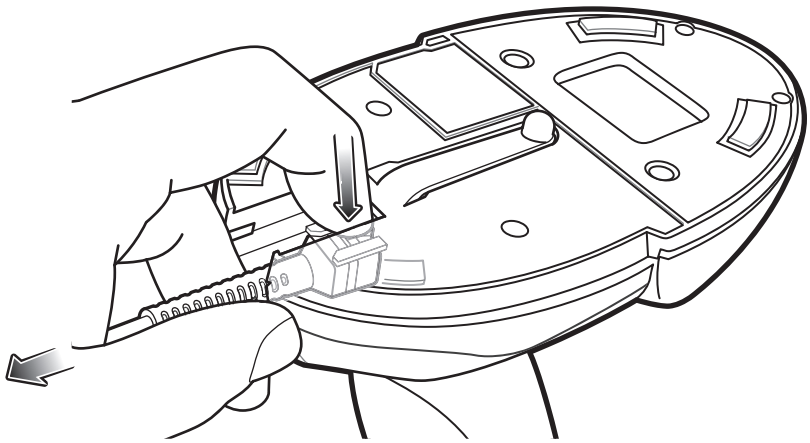


Figure 1-3 *Removing the Cable*

2. Carefully slide out the cable.
3. Follow the steps for *Connecting the Interface Cable* to connect a new cable.

Connecting to a USB Interface

1. Plug the USB interface cable series A connector in the USB host or hub, or plug the Plus Power connector into an available port on the IBM SurePOS terminal.
2. If **not** using a PowerPlus cable, connect external power:
   a. Plug the power supply adapter cable into the power jack on the interface cable.
   b. Connect the other end of the power supply adapter cable to the power supply.
   c. Plug the power supply into an AC outlet.

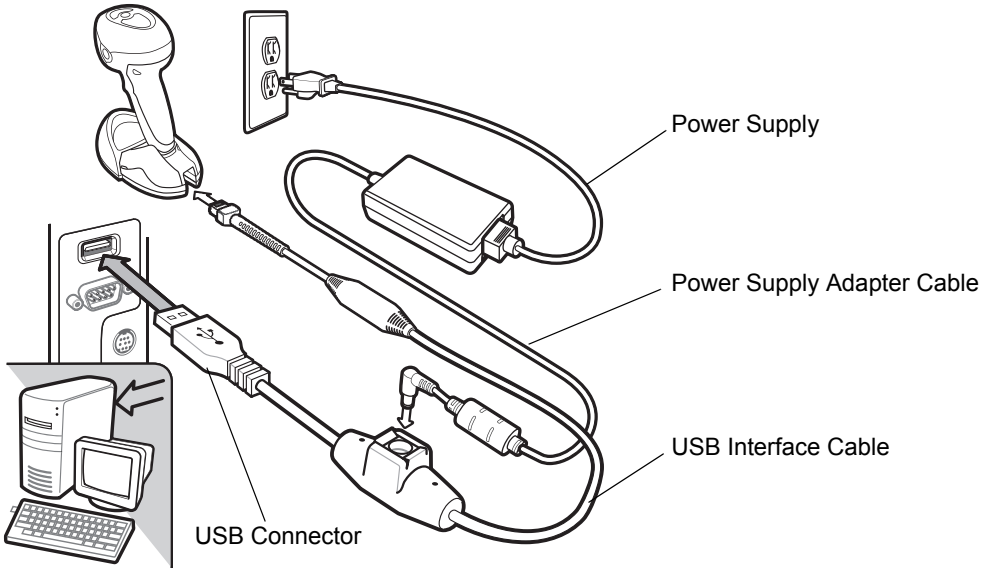


Figure 1-4 *USB Connection*

3. Select the USB device type by scanning the appropriate bar code from the *Symbol DS9808 Product Reference Guide*.
4. On first installation when using Windows, the software prompts to select or install the Human Interface Device driver. To install this driver, provided by Windows, click **Next** through all the choices and click **Finished** on the last choice. The digital scanner powers up during this installation.

Connecting to an RS-232/SSI Interface

1. Connect the RS-232/SSI interface cable to the serial port on the host.
2. Connect the power supply adapter cable to the serial connector end of the interface cable.
3. Connect the other end of the power supply adapter cable to the power supply.
4. Plug the power supply into an AC outlet.

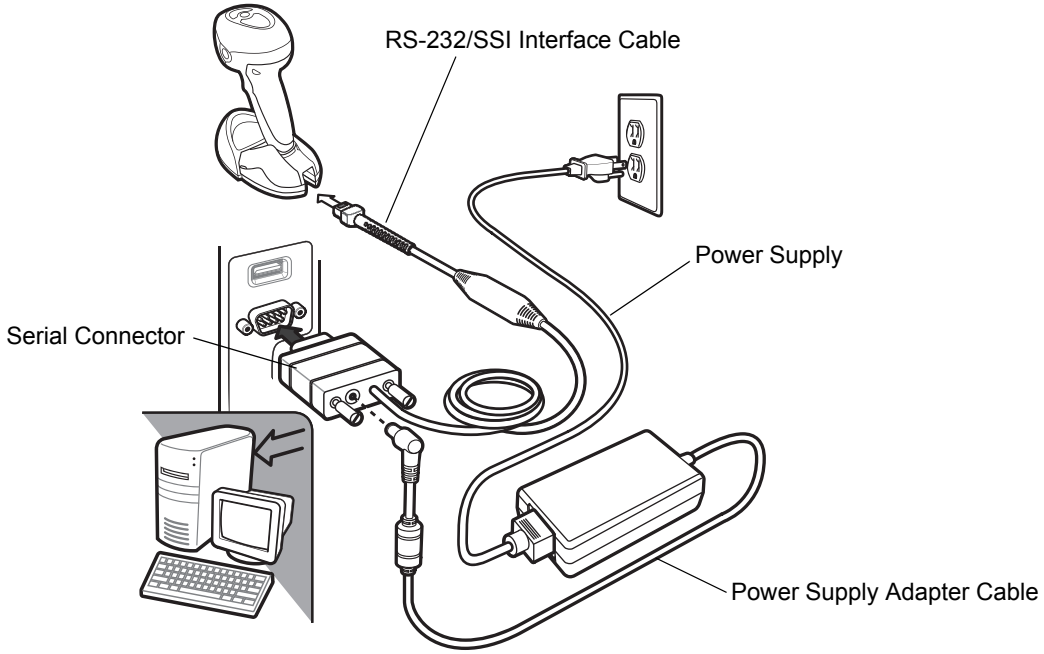


Figure 1-5 *RS-232 Direct Connection*

5. Select the RS-232 host type by scanning the appropriate bar code from the *Symbol DS9808 Product Reference Guide*, or if using SSI scan the appropriate baud rate bar code from *Baud Rate on page 4-3* that matches the host's baud rate setting.

Connecting to an IBM 468X/469X Interface

1. Connect the IBM 46XX interface cable to the appropriate port on the host (Port 9B or Port 5B).
2. If using Port 5B, connect power (Port 9B does not require a separate power supply):
   a. Connect the power supply adapter cable to the power jack on the interface cable.
   b. Connect the other end of the power supply adapter cable to the power supply.
   c. Plug the power supply into an AC outlet.

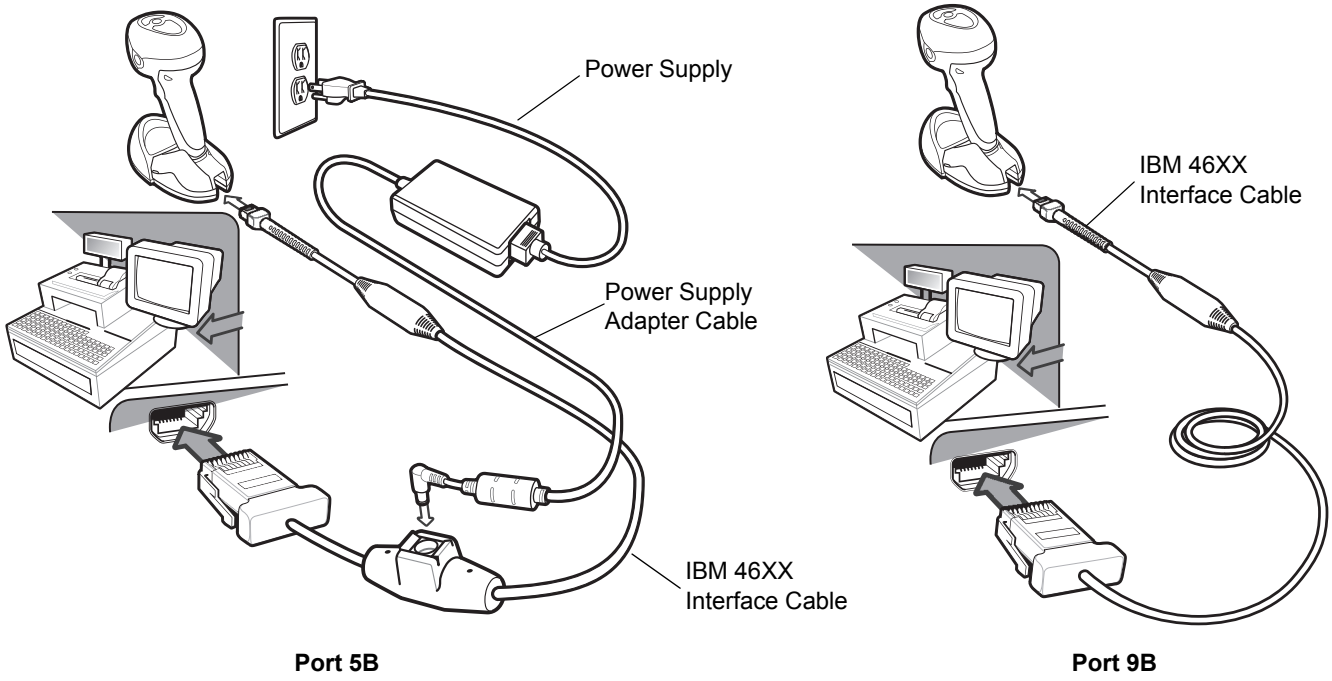


Figure 1-6 *IBM 468X/469X Connection*

3. Select the port address by scanning the appropriate bar code from *Symbol DS9808 Product Reference Guide*.

Chapter 2 Data Capture

Introduction

This chapter provides beeper and LED definitions, and techniques involved in reading RFID tags.

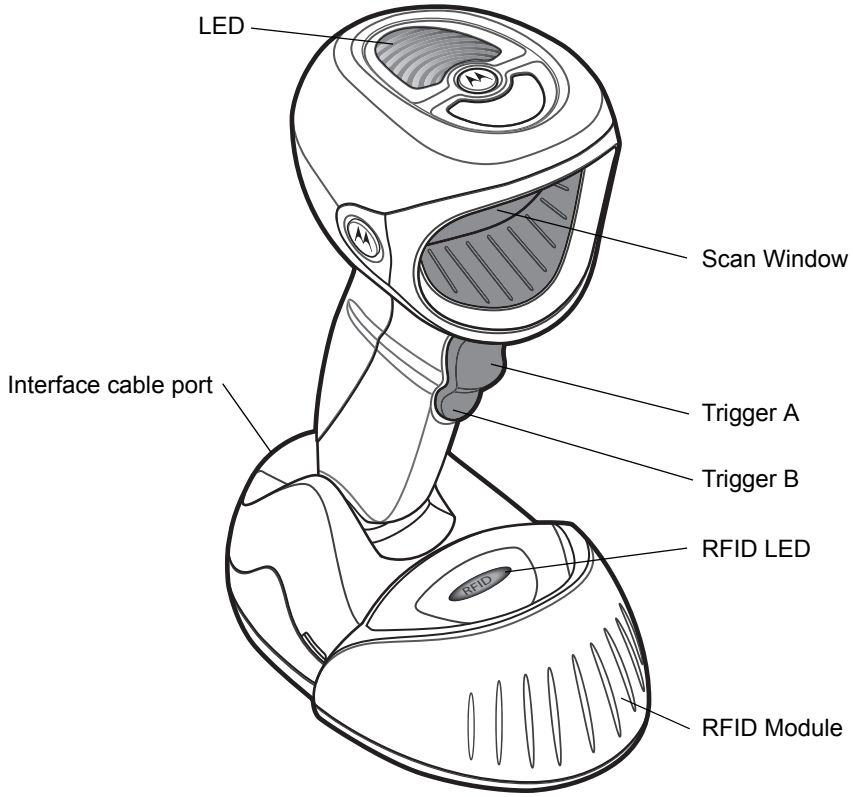


Figure 2-1 *Parts*

Beeper Definitions

The digital scanner issues different beep sequences and patterns to indicate status. *Table 2-1* defines beep sequences that occur during both normal scanning and while programming the digital scanner.

Table 2-1 *Beeper Definitions*

Beeper Sequence	Indication
Standard Use	
Low/medium/high beeps	Power up.
Short high beep	A bar code symbol was decoded (if decode beeper is enabled).
4 long low beeps	Transmission error.
5 low beeps	Conversion or format error.
Low/low/low/extra low beeps	RS-232 receive error.
High beep	The digital scanner detected a <BEL> character over RS-232.
RFID	
Medium-high (two-tone) beep	An RFID tag was read (if RFID read beeper is enabled).
High-medium/low/low beeps	Unexpected RFID indication.
Image Capture	
Low beep	Snapshot mode started or completed.
High/low beeps	Snapshot mode timed out.
Parameter Menu Scanning	
Low/high beeps	Input error; incorrect bar code, programming sequence, or **Cancel** scanned.
High/low beeps	Keyboard parameter selected. Enter value using numeric bar codes.
High/low/high/low beeps	Successful program exit with change in parameter setting.
Code 39 Buffering	
High/low beeps	New Code 39 data was entered into the buffer.
3 long high beeps	Code 39 buffer is full.
High/low/high beeps	The Code 39 buffer was erased.
Low/high/low beeps	The Code 39 buffer was erased or there was an attempt to clear or transmit an empty buffer.
Low/high beeps	A successful transmission of buffered data.

Table 2-1 *Beeper Definitions (Continued)*

Beeper Sequence	Indication
Macro PDF	
2 low beeps	MPDF sequence buffered.
2 long low beeps	File ID error. A bar code not in the current MPDF sequence was scanned.
3 long low beeps	Out of memory. There is not enough buffer space to store the current MPDF symbol.
4 long low beeps	Bad symbology. Scanned a 1D or 2D bar code in a MPDF sequence, a duplicate MPDF label, a label in an incorrect order, or trying to transmit an empty or illegal MPDF field.
5 long low beeps	Flushing MPDF buffer.
Fast warble beep	Aborting MPDF sequence.
Low/high beeps	Flushing an already empty MPDF buffer.
Host Specific	
USB only	
4 short high beeps	The digital scanner has not completed initialization. Wait several seconds and scan again.
Low/medium/high beeps upon scanning a USB device type	Communication with the host must be established before the digital scanner can operate at the highest power level.
Low/medium/high beeps occur more than once	The USB host can put the digital scanner in a state where power to the scanner is cycled on and off more than once. This is normal and usually happens when the PC cold boots.
RS-232 only	
1 short high beep	A <BEL> character is received and Beep on <BEL> is enabled.

LED Definitions

In addition to beep sequences, the digital scanner uses a two-color LED to indicate status. *Table 2-2* defines LED colors that display during scanning.

Table 2-2 *Standard LED Definitions*

LED	Indication
Hand-Held Scanning Standard Use	
Green	A bar code was successfully decoded or an RFID tag was read.
Red	Transmission error, conversion or format error, or RS-232 receive error.
Off	No power is applied to the digital scanner, or the scanner is on and ready to scan.
Hands-Free (Presentation) Scanning Standard Use	
Green	The scanner is on and ready to scan.
Momentarily Off	A bar code was successfully decoded or an RFID tag was read.
Red	Transmission error, conversion or format error, or RS-232 receive error.
Off	No power is applied to the digital scanner, or the scanner is in low power mode.
RFID LED (on the RFID module)	
Off	The RFID module is inactive.
On	The RFID module is ready to read tags.
Momentarily Off	The RFID module read a tag.
Slow blinking	The RFID module is polling for new tags.
Parameter Programming	
Green	Number expected. Enter value using numeric bar codes. Successful program exit with change in parameter setting.
Red	Input error: incorrect bar code, programming sequence, or Cancel scanned.

Table 2-2 *Standard LED Definitions*

LED	Indication
ADF Programming	
Green	Enter another digit. Add leading zeros to the front if necessary. Enter another alphabetic character or scan the **End of Message** bar code. All criteria or actions cleared for current rule, continue entering rule. Delete last saved rule. The current rule is left intact. All rules deleted.
Blinking Green	Enter another criterion or action, or scan the **Save Rule** bar code.
Green after Blinking	Rule saved. Rule entry mode exited. Cancel rule entry. Rule entry mode exited because of an error or the user asked to exit rule entry.
Red	Out of rule memory. Erase some existing rules, then try to save rule again. Entry error, wrong bar code scanned, or criteria/action list is too long for a rule. Re-enter criterion or action.

Reading RFID Tags

NOTE The top surface of the digital scanner base may feel slightly warm. This is normal and does not indicate a problem.

Hands-Free RFID

The digital scanner is in hands-free mode when it sits on a countertop. In this mode, the digital scanner operates in continuous (constant-on) mode by default, where it automatically reads RFID tags within the radio frequency (RF) field of view.

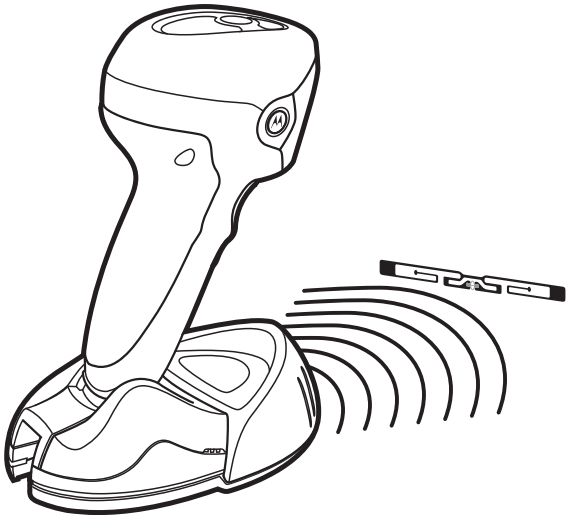


Figure 2-2 *RFID in Hands-Free Mode*

The digital scanner beeps and the RFID LED momentarily turns off upon a tag read.

If the digital scanner does not observe any new RFID tags within the *RFID Hands-Free Idle Timeout on page 3-26*, it reduces power consumption by polling for tags once a second.

Hand-Held RFID

In hand-held mode, press the trigger to read all RFID tags within the RF field of view. Release the trigger to stop reading tags.

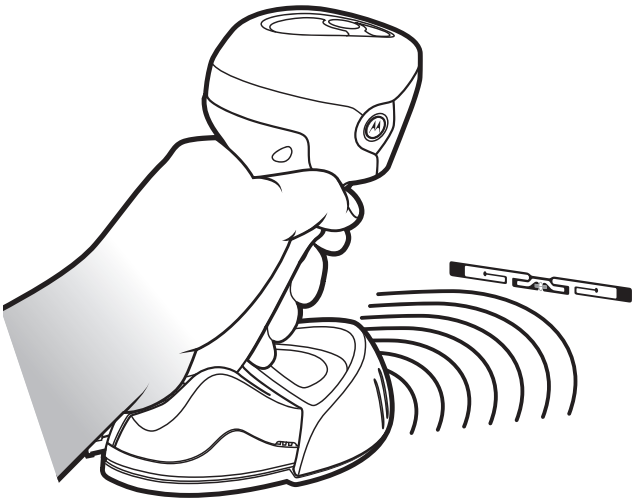


Figure 2-3 *RFID in Hand-Held Mode*

The digital scanner beeps and the RFID LED momentarily turns off upon a tag read.

DS9808-LR/LL Multifunction Trigger

The DS9808-LR/LL digital scanner includes a multifunction trigger which you can program to quickly switch between imaging, laser scanning, and/or RFID reading. See *Multifunction Mode Triggering on page 3-4* for more information.

RFID Reading Recommendations

- When holding the digital scanner, don't allow your fingers to get any closer to the antenna structure (in the base) than necessary. This can shield the tag from the RFID reader and reduce performance.
- When reading multiple items, it is highly recommended to pass one item at a time past the digital scanner. While you can pass many items at a time by the digital scanner, it can be difficult to correlate multiple beeps to multiple items at once and errors can occur.
- Use care when reading metal items. The metals can reduce tag read range or in some cases shield the tag from the reader. Always correlate the read beep with the item the digital scanner is reading (as with bar code scanning).
- Never hold the RFID tag of the item the digital scanner is reading. Instead, hold the item and let the tag hang free.
- Orient the tag toward the digital scanner if it has difficulty reading the tag. Waving often helps.
- If all else fails, scan the item's bar code.

Chapter 3 RFID Preferences

Introduction

NOTE The RFID module is not available in all countries. Contact a Motorola sales representative for more information.

You can program the digital scanner to perform various functions, or activate different features. This chapter describes RFID preference features and provides programming bar codes for selecting these features. To program other features, refer to the *Symbol DS9808 Product Reference Guide.*

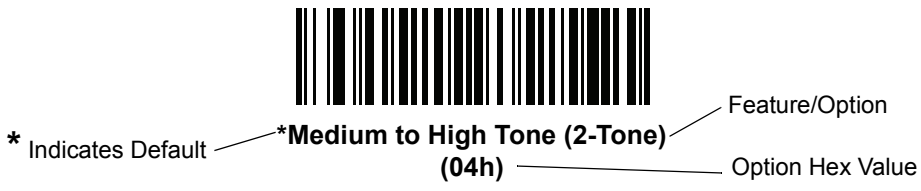
The digital scanner ships with the settings in *RFID Preferences Parameter Defaults on page 3-2*. If the default values suit requirements, programming is not necessary.

To set feature values, scan a single bar code or a short bar code sequence. The settings are stored in non-volatile memory and are preserved even when you power down the digital scanner.

NOTE Most computer monitors allow scanning the bar codes directly on the screen. When scanning from the screen, be sure to set the document magnification to a level where you can see the bar code clearly, and bars and/or spaces are not merging.

If not using a USB cable, select a host type after the power-up beeps sound. Refer to the *Symbol DS9808 Product Reference Guide* for specific host information. This is only necessary upon the first power-up when connecting to a new host.

To return all features to default values, scan the **Set Default** parameter in the *Symbol DS9808 Product Reference Guide*. Throughout the programming bar code menus, asterisks (*) indicate default values.



Scanning Sequence Examples

In most cases scanning one bar code sets the parameter value. For example, to turn the beeper off, scan the **Off** bar code under *RFID Beeper Tone on page 3-11*. The digital scanner issues a fast warble beep and the LED turns green, signifying a successful parameter entry.

Other parameters require scanning several bar codes. See these parameter descriptions for this procedure.

Errors While Scanning

Unless otherwise specified, to correct an error during a scanning sequence, just re-scan the correct parameter.

RFID Preferences Parameter Defaults

Table 3-1 lists the defaults for RFID preferences parameters. To change the default values, scan the appropriate bar codes in this guide. These new values replace the standard default values in memory. To recall the default parameter values, scan the **Set Default** parameter in the *Symbol DS9808 Product Reference Guide*.

Table 3-1 *RFID Preferences Parameter Defaults*

Parameter	Parameter Number	Default	Page Number
RFID Preferences			
Multifunction Triggering		Single Trigger	*3-4*
Trigger A	F1h 77h	Laser Preferred Decoding	*3-4*
Trigger B	F1h 78h	RFID Reading	*3-6*
Trigger A + B	F1h 79h	Ignore	*3-7*
Laser Preferred Timeout	F1h 7Dh	1.5 seconds	*3-8*
Dual Trigger Debounce Timeout	F1h 7Ah	0.05 seconds	*3-8*
Dual Trigger Processing	F1h 7Bh	Wait	*3-9*
Host Trigger Mode	F1h 7Ch	Imager Decoding	*3-9*
RFID Beeper Tone	F1h 7Fh	Medium to High Tone (2-Tone)	*3-11*
RFID Same Tag Timeout	F1h 80h	5 Minutes	*3-12*
RFID Automatic Presentation Mode	F1h 81h	Hands-Free Only	*3-14*
RFID Trigger Mode	F1h 82h	Continuous	*3-15*
RFID Data Transmission Format	F1h 83h	Raw	*3-16*
RFID Transmit Raw with PC Bytes	F1h CAh	Disable	*3-20*
RFID Transmit Unknown Tag Data	F1h C5h	Transmit	*3-20*
RFID Antenna Selection	F1h C6h	Both	*3-21*

Table 3-1 *RFID Preferences Parameter Defaults (Continued)*

Parameter	Parameter Number	Default	Page Number
RFID Antenna Power in Hand-Held Mode	F1h C7h	Level 5	*3-22*
RFID Antenna Power in Hands-Free Mode	F1h C8h	Level 5	*3-24*
RFID Hands-Free Idle Timeout	F1h C9h	5 Minutes	*3-26*

RFID Preferences

The parameters in this chapter control RFID behavior.

Multifunction Mode Triggering

You can set trigger options for each of the digital scanner's trigger positions. For example, set Trigger A (pressed with your index finger) to imager decoding, set Trigger B (pressed with your middle finger) for laser decoding, and set Trigger A + B (pressed with both fingers) for RFID reading.

The default operation is single trigger, so if you do not assign values to each trigger option (or assign Trigger A only), Trigger B operates the same as Trigger A, and a dual trigger pull is ignored.

Select one of the following functions for each trigger using the bar codes on the next few pages:

- **Laser Preferred Decoding** - Programs the trigger for decoding using the laser engine first, then the imager if a decode does not occur. Refer to the *Symbol DS9808 Product Reference Guide* for more information. DS9808-SR/DL models do not support this option.
- **Imager Decoding** - Programs the trigger for decoding using the imager engine.
- **RFID Reading** - Programs the trigger for reading RFID tags.
- **Imager Plus RFID** - A trigger pull attempts decode using the imager engine, and turns on the optional RFID reader, if available, to read RFID tags.
- **Laser Preferred Plus RFID** - A trigger pull attempts decode using the laser engine first, then the imager if a decode does not occur, and also turns on the RFID reader to read RFID tags. DS9808-SR/DL models do not support this option.
- **Laser Only Decoding** - Programs the trigger for decoding using the laser engine only. DS9808-SR/DL models do not support this option.
- **Set to Trigger A Value** (Trigger B Only) - Sets Trigger B to the same value as Trigger A. This allows you to automatically program Trigger B upon selecting the function of Trigger A.
- **Ignore Dual Trigger Pull** (Trigger A+B Only) - Uses the mode of the first trigger pull only. This increases triggering efficiency when the dual trigger is not needed.

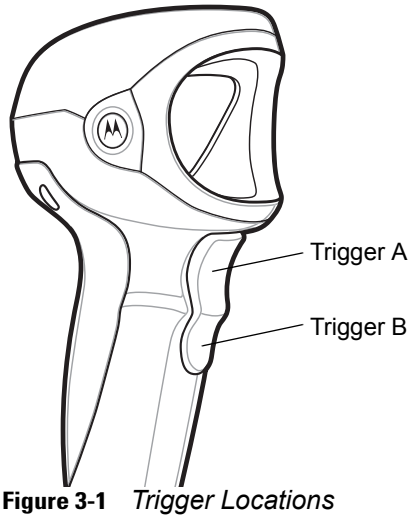


Figure 3-1 *Trigger Locations*

Trigger A

Parameter # F1h 77h

NOTE You cannot set Trigger A to **RFID Reading** if Trigger B is set to either **RFID Reading** or **Set to Trigger A Value**. In addition, laser options are not available for DS9808-SR/DL models.

***Laser Preferred Decoding**
(00h)

****Imager Decoding**
(01h)

RFID Reading
(02h)

Imager Plus RFID
(03h)

Laser Preferred Plus RFID
(04h)

Laser Only Decoding
(06h)

*Default for DS9808-LR/LL
**Default for DS9808-SR/DL

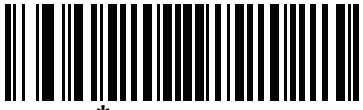
Trigger B

Parameter # F1h 78h

NOTE You cannot set Trigger B to **RFID Reading** or **Set to Trigger A Value** if Trigger A is set to **RFID Reading**. In addition, laser options are not available for DS9808-SR/DL models.

Laser Preferred Decoding
(00h)

Imager Decoding
(01h)



***RFID Reading**
(02h)
(*Default when used with RFID)

Imager Plus RFID
(03h)

Laser Preferred Plus RFID
(04h)

Set to Trigger A Value
(05h)

Laser Only Decoding
(06h)

Trigger A+B

Parameter # F1h 79h

NOTE Laser options are not available for DS9808-SR/DL models.

Laser Preferred Decoding
(00h)

Imager Decoding
(01h)

RFID Reading
(02h)

Imager Plus RFID
(03h)

Laser Preferred Plus RFID
(04h)

***Ignore Dual Trigger Pull (Use Mode of First Trigger Pull)**
(05h)

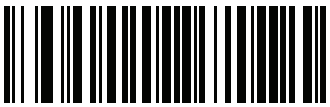
Laser Only Decoding
(06h)

Laser Preferred Timeout

Parameter # F1h 7Dh

If Multifunction Mode Triggering is set to Laser Preferred Decoding, use this parameter to set the time period that the laser remains on before using the imager if a decode does not occur.

To set the timeout, scan the bar code below, followed by two bar codes from Appendix A, Numeric Bar Codes that correspond to the desired time in the range of 0.1 to 9.9 seconds. To correct an error or change the selection, scan **Cancel** on *page A-2*. The default is 1.5 seconds.



Laser Preferred Timeout

Dual Trigger Debounce Timeout

Parameter # F1h 7Ah

Set a time period in which both triggers must be pulled in order for the digital scanner to recognize this as a dual trigger pull. In other words, if you pull Trigger A, then Trigger B after this timeout expires, the digital scanner behaves as if you pulled Trigger A only.

To set the timeout, scan the bar code below, followed by two bar codes from Appendix A, Numeric Bar Codes that correspond to the desired time in the range of 0.00 to 0.99 seconds. Enter a trailing zero for single digit numbers. For example, to set a Debounce Timeout of 0.50 seconds, scan the bar code below, then scan the **5** and **0** bar codes. To correct an error or change the selection, scan **Cancel** on *page A-2*.

The default is 0.05 seconds.

Dual Trigger Debounce Timeout

Dual Trigger Processing

Parameter # F1h 7Bh

Select whether the digital scanner processes the first trigger pull immediately, or waits until the Dual Trigger Debounce Timeout expires before processing. If the second trigger pull occurs within the timeout, the scanner switches to the combination function.

Process Immediately

***Wait for Timeout Before Processing**

Host Triggering

Parameter # F1h 7Ch

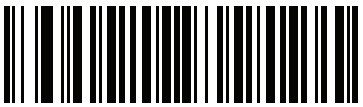
Set an option for host-initiated triggering:

- **Laser Preferred Decoding** - Programs the host trigger for decoding using the laser engine first, then the imager if a decode does not occur.
- **Imager Decoding** - Programs the trigger for decoding using the imager engine.
- **RFID Reading** - Programs the trigger for reading RFID tags.
- **Imager Plus RFID** - A trigger pull attempts decode using the imager engine, and turns on the optional RFID reader, if available, to read RFID tags.
- **Laser Preferred Plus RFID** - A trigger pull attempts decode using the laser engine first, then the imager if a decode does not occur, and also turns on the optional RFID reader, if available, to read RFID tags.
- **Laser Only Decoding** - Programs the trigger for decoding using the laser engine only.

Host Triggering (continued)

NOTE Laser options are not available for DS9808-SR/DL models.

Laser Preferred Decoding
(00h)



***Imager Decoding**
(01h)

RFID Reading
(02h)

Imager Plus RFID
(03h)

Laser Preferred Plus RFID
(04h)

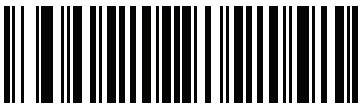
Laser Only Decoding
(06h)

RFID Beeper Tone

Parameter # F1h 7Fh

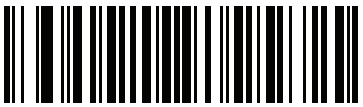
To select an RFID read beep tone, scan one of the following bar codes.

Off
(03h)



Low Tone
(02h)

Medium Tone
(01h)



High Tone
(00h)

***Medium to High Tone (2-Tone)**
(04h)

RFID Same Tag Timeout

Parameter # F1h 80h

If the digital scanner does not observe a group of tags within this timeout period, it removes the tags in the group from the tag cache. If the digital scanner later reads one of these tags, it reports this as a new tag.

Disable this timeout to report a tag every time the digital scanner sees it. This option is typically used for testing, and disables the tag cache, affecting both presentation and triggered operation.

Disable
(00h)

2 Seconds
(02h)

10 Seconds
(0Ah)

15 Seconds
(0Bh)

30 Seconds
(0Dh)

1 Minute
(11h)

RFID Same Tag Timeout (continued)

***5 Minutes**
(15h)

15 Minutes
(1Bh)

1 Hour
(21h)

RFID Automatic Presentation Mode

Parameter # F1h 81h

Select one of the following options to configure the digital scanner to continuously read tags (presentation mode) when you place the scanner on the countertop (hands-free), when you lift it (hand-held), or in both or neither situation. Note that triggered operation always overrides presentation mode.

Disable
(00h)

***Hands-Free Only**
(01h)

Hand-Held Only
(02h)

Always
(03h)

RFID Trigger Mode

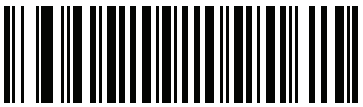
Parameter # F1h 82h

In hand-held operation, this parameter controls the behavior of a trigger programmed for RFID reading.

- Continuous - the reader reads all tags within range, maintaining the existing tag cache so it does not report tags already read.
- Single Tag Read - the reader reads and reports only one tag. It maintains the tag cache and reports this tag regardless of whether it already reported it.
- Continuous Re-Report - the reader reads all tags within range, maintaining the tag cache, and reports each tag once within this trigger session regardless of whether it already reported it.
- Continuous Flush - the reader flushes the tag cache, reads all tags within range, and reports them as new tags.

NOTE To program the trigger for various functions including RFID, see *Multifunction Mode Triggering on page 3-4* and *Host Triggering on page 3-9*.

***Continuous**
(00h)



Single Tag
(01h)

Continuous Re-Report
(02h)

Continuous Flush
(03h)

RFID Data Transmission Format

Parameter # F1h 83h

This parameter controls the format of the tag's EPC data sent after reading a new tag.

- Raw - the EPC buffer transmits as a hexadecimal string. This format can include the protocol control bytes.
- GS1-128 - for GS1 encoded tags, this option converts EPC data to a GS1-128 bar code (as per the *EPCglobal Tag Data Standards Version 1.4* available at http://www.epcglobalinc.org/standards/tds/tds_1_4-standard-20080611.pdf). Otherwise, the tag optionally transmits in raw format or is ignored.
- EPC URI - the EPC data is represented as a Universal Resource Identifier (URI) as defined in the *EPCglobal Tag Data Standards Version 1.4*.

See *Table 3-2*, *Table 3-3*, and *Table 3-4* for transmission format details for the various tag types, and samples for each. For more information, refer to *EPCglobal Tag Data Standards Version 1.4*.

***Raw**
(00h)

GS1-128
(01h)

EPC URI
(02h)

Table 3-2 *GS1-128 Transmission Details by EPC Tag Type*

EPC Tag Type	Transmission Format
GID	N/A
SGTIN	(01) GTIN (21) Serial Number
SSCC	(00) SSCC
SGLN	(414) GLN (254) GLN-Extension
GRAI	(8003) GRAI Serial Number
GIAI	(8004) GIAI Serial Number
GSRN	(8018) GSRN
GDTI	(253) GDTI
US DoD	N/A
Unknown	N/A

Table 3-3 *EPC-URI Transmission Details by EPC Tag Type*

EPC Tag Type	Transmission Format
GID	urn:epc:tag:gid-96:<generalMngr>.<objectClass>.<serno>
SGTIN	urn:epc:tag:sgtin-96:<filter>.<company>.<itemRef>.<serialNumber>
SSCC	urn:epc:tag:sscc-96:<filter>.<companyPrefix>.<serialReference>
SGLN	urn:epc:tag:sgln-96:<filter>.<companyPrefix>.<locationReference>.<extention>
GRAI	urn:epc:tag:grai-96:<filter>.<companyPrefix>.<assetType>.<serialNumber>
GIAI	urn:epc:tag:giai-96:<filter>.<companyPrefix>.<individulAssetReference>
GSRN	urn:epc:tag:gsrn-96:<filter>.<companyPrefix>.<serviceReference>
GDTI	urn:epc:tag:gdti-96:<filter>.<companyPrefix>.<documentType>.<serialNumber>
US DoD	urn:epc:tag:usdod-96:<filter>.<govManagedID>.<serialNumber>
Unknown	urn:epc:tag:raw:BitLength.Value
Unknown (non-EPC)	urn:epc:raw:BitLength.AFI.Value

Examples

Table 3-4 *Transmission Format Examples*

EPC Tag Type	Format	Example
GID	Raw	3500004D20004D20000004D2
	GS1-128	N/A
	EPC-URI	urn:epc:tag:gid-96:1234.1234.1234
SGTIN	Raw	3018789004B5A1C0499602D2
	GS1-128	(01)11234562345675(21)1234567890
	EPC-URI	urn:epc:tag:sgtin-96:0.123456.1234567.1234567890
SSCC	Raw	310C75BCD150BC614E000000
	GS1-128	(00)112345678923456787
	EPC-URI	urn:epc:tag:sscc-96:0.123456789.12345678
SGLN	Raw	320C0BC614E0180000003039
	GS1-128	(414)0123456780125(254)12345
	EPC-URI	urn:epc:tag:sgln-96:0.012345678.012.12345
GRAI	Raw	33180C0E400C0E4000003039
	GS1-128	(8003)012345012345412345
	EPC-URI	urn:epc:tag:grai-96:0.012345.012345.12345
GIAI	Raw	3400001D6F345400075BCD15
	GS1-128	(8004)000123456789123456789
	EPC-URI	urn:epc:giai-96:0.000123456789.123456789
GSRN	Raw	2D00001D6F345404D2000000
	GS1-128	(8018)000123456789012343
	EPC-URI	urn:epc:tag:gsrn-96:0.000123456789.01234
GDTI	Raw	2C180C0E4060720000003039
	GS1-128	(253)012345012345412345
	EPC-URI	urn:epc:tag:gdti-96:0.012345.012345.12345
US DoD	Raw	2F0414243313233000003039
	GS1-128	N/A
	EPC-URI	urn:epc:tag:usdod-96:0.ABC123.12345

Note: Parentheses appear in examples only for readability.

Table 3-4 *Transmission Format Examples (Continued)*

EPC Tag Type	Format	Example
Unknown	Raw	1234567890ABCDEF01234567
	GS1-128	N/A
	EPC-URI	urn:epc:raw:96.x1234567890ABCDEF01234567
Unknown (non-EPC)	Raw with PC Bytes	31231234567890ABCDEF00000002
	EPC-URI	urn:epc:raw:96.x23.x1234567890ABCDEF00000002
Note: Parentheses appear in examples only for readability.		

RFID Transmit Raw with PC Bytes

Parameter # F1h CAh

When transmitting RFID tags in raw format, this parameter determines whether to include the Protocol Control (PC) bytes of the EPC data. This is useful when reading non-EPC encoded tags. Refer to *EPCglobal Tag Data Standards Version 1.4* available at http://www.epcglobalinc.org/standards/tds/tds_1_4-standard-20080611.pdf, section 3.2.1 *EPC Memory Contents*.

Enable
(01h)

***Disable**
(00h)

RFID Transmit Unknown Tag Data

Parameter # F1h C5h

When transmitting RFID tags in GS1-128 format, if the digital scanner can not translate the tag (i.e., it is not GS1 encoded), it can either report the tag in raw format or ignore it.

Ignore
(00h)

***Transmit in Raw Format**
(01h)

RFID Antenna Selection

Parameter # F1h C6h

Use this parameter to select reading RFID tags using the horizontally oriented antenna, the vertically oriented antenna, or both.

***Both**
(00h)

Horizontal
(01h)

Vertical
(02h)

RFID Antenna Power in Hand-Held Mode

Parameter # F1h C7h

This parameter controls the antenna RF power when operated in hand-held mode. *Table 3-5* lists the levels and the associated range as a percent of the baseline range. The baseline range is the range that results when the power level is set to the maximum level of 7, and can vary depending on the environment, tag sensitivity, and orientation.

Table 3-5 *Antenna Power Levels in Hand-Held Mode*

Level	Power (dBm)	Range (% of Baseline)
1	5	12%
2	8	18%
3	11	25%
4	14	35%
5	17	50%
6	20	67%
7	24	100%

NOTE Baseline can vary depending on environment, tag sensitivity, and orientation.

RFID Antenna Power in Hand-Held Mode (continued)

Level 1
(01h)

Level 2
(02h)

Level 3
(03h)

Level 4
(04h)

***Level 5**
(05h)

Level 6
(06h)

Level 7
(07h)

RFID Antenna Power in Hands-Free Mode

Parameter # F1h C8h

This parameter controls the antenna RF power when operated in hands-free mode. *Table 3-6* lists the levels and the associated range as a percent of the baseline range. The baseline range is the range that results when the power level is set to the maximum level of 7, and can vary depending on the environment, tag sensitivity, and orientation.

Table 3-6 *Antenna Power Levels in Hands-Free Mode*

Level	Power (dBm)	Range (% of Baseline)
1	5	12%
2	8	18%
3	11	25%
4	14	35%
5	17	50%
6	20	67%
7	24	100%

NOTE Baseline can vary depending on environment, tag sensitivity, and orientation.

RFID Antenna Power in Hands-Free Mode (continued)

Level 1
(01h)

Level 2
(02h)

Level 3
(03h)

Level 4
(04h)

***Level 5**
(05h)

Level 6
(06h)

Level 7
(07h)

RFID Hands-Free Idle Timeout

Parameter # F1h C9h

This parameter sets the idle timeout in hands-free mode. If the digital scanner does not observe any new RFID tags within this timeout, it reduces power consumption by polling for tags once a second.

Disable
(00h)

2 Seconds
(02h)

10 Seconds
(0Ah)

15 Seconds
(0Bh)

30 Seconds
(0Dh)

1 Minute
(11h)

RFID Hands-Free Idle Timeout (continued)

***5 Minutes**
(15h)

15 Minutes
(1Bh)

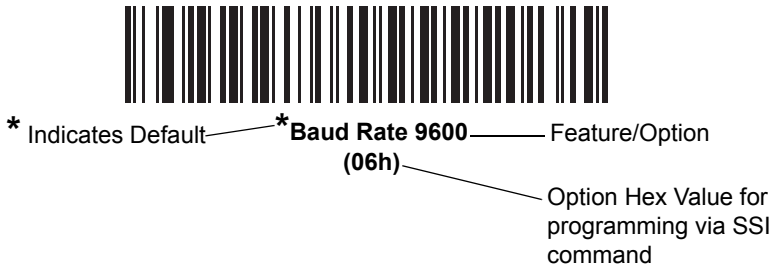
1 Hour
(21h)

Chapter 4 SSI Interface

Introduction

When connected to a a Simple Serial Interface (SSI) host, program the digital scanner via bar code menu or SSI host commands.

Throughout the programming bar code menus, asterisks (*) indicate default values.



NOTE Most computer monitors allow scanning the bar codes directly on the screen. When scanning from the screen, be sure to set the document magnification to a level where you can see the bar code clearly, and bars and/or spaces are not merging.

Simple Serial Interface Default Parameters

Table 4-1 lists the defaults for the SSI host. There are two ways to change the default values:

- Scan the appropriate bar codes in this guide. These new values replace the standard default values in memory. To recall the default parameter values, scan the **Set Default** parameter in the *Symbol DS9808 Product Reference Guide*.
- Download data through the device's serial port using SSI. Hexadecimal parameter numbers appear in this chapter below the parameter title, and options appear in parenthesis beneath the accompanying bar codes. See the *Simple Serial Interface (SSI) Programmer's Guide* for detailed instructions for changing parameters using this method.

Table 4-1 *SSI Interface Parameter Defaults*

Parameter	Parameter Number	Default	Page Number
Baud Rate	9Ch	9600	*4-3*
Parity	9Eh	None	*4-4*
Check Parity	97h	Enable	*4-5*
Software Handshaking	9Fh	ACK/NAK	*4-5*
Host RTS Line State	9Ah	Low	*4-6*
Decode Data Packet Format	EEh	Send Raw Decode Data	*4-6*
Host Serial Response Time-out	9Bh	2 sec	*4-7*
Host Character Time-out	EFh	200 msec	*4-8*
Multipacket Option	F0h 4Eh	Option 1	*4-9*
Interpacket Delay	F0h 4Fh	0 ms	*4-10*
Event Reporting			
Decode Event	F0h 00h	Disable	*4-11*
Boot Up Event	F0h 02h	Disable	*4-12*
Parameter Event	F0h 03h	Disable	*4-12*

NOTE SSI interprets Prefix, Suffix1, and Suffix2 values listed in the default table in the *Symbol DS9808 Product Reference Guide* differently than other interfaces. SSI does not recognize key categories, only the 3-digit decimal value. The default value of 7013 is interpreted as CR only.

SSI Host Parameters

Baud Rate

Parameter # 9Ch

Baud rate is the number of bits of data transmitted per second. Set the digital scanner's baud rate to match the data rate setting of the host device. Otherwise, data may not reach the host or may reach it in distorted form.

To enable the SSI host, scan the appropriate baud rate bar code that matches the baud rate setting of the host device.

NOTE The digital scanner does not support baud rates below 9600.

***Baud Rate 9600**
(06h)

Baud Rate 19,200
(07h)

38,400
(08h)

57,600
(0Ah)

115,200
(0Bh)

230,400
(0Ch)

Parity

Parameter # 9Eh

A parity check bit is the most significant bit of each ASCII coded character. Select the parity type according to host device requirements.

- Select **Odd** parity to set the parity bit to a value 0 or 1, based on data, to ensure that the coded character contains an odd number of 1 bits.
- Select **Even** parity to set the parity bit to a value 0 or 1, based on data, to ensure that the coded character contains an even number of 1 bits.
- If no parity is required, select **None**.

Odd
(00h)

Even
|(01h)

***None**
(04h)

Check Parity

Parameter # 97h

Select whether or not to check the parity of received characters. Use the Parity parameter to select the type of parity.

*Check Parity
(01h)

Do Not Check Parity
(00h)

Software Handshaking

Parameter # 9Fh

This parameter offers control of the data transmission process in addition to that offered by hardware handshaking. Hardware handshaking is always enabled and cannot be disabled by the user.

- **Disable ACK/NAK Handshaking**: If you select this option, the digital scanner neither generates nor expects ACK/NAK handshaking packets.
- **Enable ACK/NAK Handshaking**: If you select this option, after transmitting data, the digital scanner expects either an ACK or NAK response from the host. The digital scanner also ACKs or NAKs messages from the host.

  The digital scanner waits up to the programmable Host Serial Response Time-out to receive an ACK or NAK. If the scanner does not get a response in this time, it resends its data up to two times before discarding the data and declaring a transmit error.

Disable ACK/NAK
(00h)

*Enable ACK/NAK
(01h)

Host RTS Line State

Parameter # 9Ah

This parameter sets the expected idle state of the Serial Host RTS line.

The SSI Interface is used with host applications which also implement the SSI protocol. However, you can also use the digital scanner in a "scan-and-transmit" mode to communicate with any standard serial communication software on a host PC (see *Decode Data Packet Format on page 4-6*). If transmission errors occur in this mode, the host PC may be asserting hardware handshaking lines which interfere with the SSI protocol. Scan the **Host: RTS High** bar code to address this problem.

***Host: RTS Low**
(00h)

Host: RTS High
(01h)

Decode Data Packet Format

Parameter # EEh

This parameter selects whether to transmit decoded data in raw format (unpacketed), or with the packet format defined by the serial protocol.

Selecting the raw format disables ACK/NAK handshaking for decode data.

***Send Raw Decode Data**
(00h)

Send Packeted Decode Data
(01h)

Host Serial Response Time-out

Parameter # 9Bh

This parameter specifies how long the digital scanner waits for an ACK or NAK before resending. Also, if the digital scanner wants to send, and the host was already granted permission to send, the digital scanner waits for the designated time-out before declaring an error.

To set the delay period (options are 2, 5, 7.5, or 9.9 seconds), scan one of the following bar codes.

NOTE Other values are available via SSI command.

***Low - 2 Seconds**
(14h)

Medium - 5 Seconds
(32h)

High - 7.5 Seconds
(4Bh)

Maximum - 9.9 Seconds
(63h)

Host Character Time-out

Parameter # EFh

This parameter determines the maximum time the digital scanner waits between characters transmitted by the host before discarding the received data and declaring an error.

To set the delay period (options are 200, 500, 750, or 990 ms), scan one of the following bar codes.

NOTE Other values are available via SSI command.

***Low - 200 ms**
(0Ah)

Medium - 500 ms
(32h)

High - 750 ms
(4Bh)

Maximum - 990 ms
(63h)

Multipacket Option

Parameter # F0h, 4Eh

This parameter controls ACK/NAK handshaking for multi-packet transmissions.

- **Multi-Packet Option 1**: The host sends an ACK / NAK for each data packet during a multi-packet transmission.
- **Multi-Packet Option 2**: The digital scanner sends data packets continuously, with no ACK/NAK handshaking to pace the transmission. The host, if overrun, can use hardware handshaking to temporarily delay digital scanner transmissions. At the end of transmission, the digital scanner waits for a CMD_ACK or CMD_NAK.
- **Multi-Packet Option 3**: Option 3 is the same as option 2 with the addition of a programmable interpacket delay.

***Multipacket Option 1**
(00h)

Multipacket Option 2
(01h)

Multipacket Option 3
(02h)

Interpacket Delay

Parameter # F0h, 4Fh

This parameter specifies the interpacket delay when **Multipacket Option 3** is selected.

To set the delay period (options are 0, 25, 50, 75, or 99 ms), scan one of the following bar codes.

NOTE Other values are available via SSI command.

***Minimum - 0 ms**
(00h)

Low - 25 ms
(19h)

Medium - 50 ms
(32h)

High - 75 ms
(4Bh)

Maximum - 99 ms
(63h)

Event Reporting

The host can request the digital scanner to provide certain information (events) relative to the digital scanner's behavior. Enable or disable the events listed in *Table 4-2* and on the following pages by scanning the appropriate bar codes.

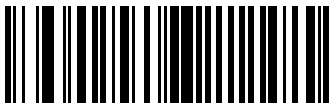
Table 4-2 *Event Codes*

Event Class	Event	Code Reported
Decode Event	Non parameter decode	0x01
Boot Up Event	System power-up	0x03
Parameter Event	Parameter entry error	0x07
	Parameter stored	0x08
	Defaults set (and parameter event is enabled by default)	0x0A
	Number expected	0x0F

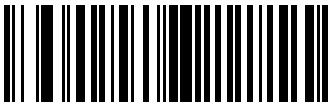
Decode Event

Parameter # F0h, 00h

When enabled, the digital scanner generates a message to the host when it successfully decodes a bar code. When disabled, no notification is sent.



Enable Decode Event (01h)



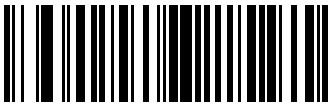
***Disable Decode Event (00h)**

Boot Up Event

Parameter # F0h, 02h

When enabled, the digital scanner generates a message to the host when power is applied. When disabled, no notification is sent.

Enable Boot Up Event
(01h)

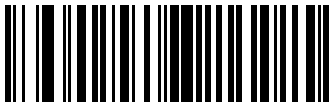


***Disable Boot Up Event**
(00h)

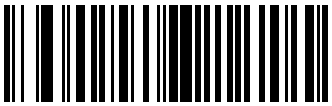
Parameter Event

Parameter # F0h, 03h

When enabled, the digital scanner generates a message to the host when one of the events specified in *Table 4-2 on page 4-11* occurs. When disabled, no notification is sent.



Enable Parameter Event
(01h)



***Disable Parameter Event**
(00h)

Chapter 5 Advanced Data Formatting

Introduction

Advanced Data Formatting (ADF) is a means of customizing data before transmission to the host device. Use ADF to edit scan data to suit requirements. Implement ADF by scanning a related series of bar codes which program the digital scanner with ADF rules.

For information and programming bar codes for ADF, including RFID code type criteria bar codes, refer to the *Advanced Data Formatting Programmer Guide*, p/n 72E-69680-xx.

Chapter 6 Maintenance & Technical Specifications

Introduction

This chapter provides suggested RFID digital scanner maintenance, troubleshooting, and technical specifications.

Maintenance

Cleaning the scan window is the only maintenance required. A dirty window can affect scanning accuracy.

- Do not allow abrasive material to touch the window.
- Remove any dirt particles with a damp cloth.
- Wipe the window using a tissue moistened with ammonia/water.
- Do not spray water or other cleaning liquids directly into the window.

Troubleshooting

Table 6-1 *Troubleshooting*

Problem	Possible Causes	Possible Solutions
Digital scanner emits 4 short high beeps during read attempt.	Digital scanner has not completed USB initialization.	Wait several seconds and read again.
Digital scanner reads the tag, but does not transmit the data to the host.	Digital scanner is not programmed for the correct host type.	Scan the appropriate host type programming bar code. See the *Symbol DS9808 Product Reference Guide*.
	Interface cable is loose.	Re-connect the cable.
	If the digital scanner emits 4 long low beeps, a transmission error occurred.	Set the digital scanner's communication parameters to match the host's setting.
Host displays tag data incorrectly.	Digital scanner is not programmed to work with the host.	Scan the appropriate host type programming bar code.
		For RS-232, set the digital scanner's communication parameters to match the host's settings.
		For a keyboard wedge configuration, program the system for the correct keyboard type, and turn off the CAPS LOCK key.

NOTE If after performing these checks the digital scanner still experiences problems, contact the distributor or call Motorola Enterprise Mobility Support. See *page xi* for the telephone numbers.

Technical Specifications

For a complete list of specifications, refer to the *DS9808 Product Reference Guide*.

Table 6-2 *Technical Specifications*

Item	Description
Physical Characteristics	
Dimensions	8.5 in. (max) H x 3.5 in. W x 6 in. L 21.6 cm (max) H x 8.9 cm W x 15.2 cm L
Weight	16.4 oz / 465 g
Voltage and Current	5 V +/- 5% VDC @ 1.2 A (nominal)
Data Capture Options	1D and 2D bar codes, RFID tags
RFID Performance Characteristics	
Frequency	902-928 MHz (US, Canada, Mexico)
Tag Type	EPCglobal Class 1 Gen 2 (ISO 18000-6C)
RFID Read Range/RF Power	Adjustable from near contact up to 40 in. / 1 m depending on tag sensitivity and orientation
User Environment	
Operating Temperature	32º F to 104º F / 0º C to 40º C
Storage Temperature	-40º F to 158º F / -40º C to 70º C
Humidity	5% to 95%, non-condensing
Drop Specifications	Withstands multiple 4ft. / 1.22 m drops to concrete at operating temperature extremes.
Ambient Light Immunity	Sunlight - 8,000 ft. candles (86,000 Lux) Incandescent - 150 ft. candles (1,600 Lux) Fluorescent - 150 ft. candles (1,600 Lux) Mercury Vapor - 150 ft. candles (1,600 Lux) Sodium Vapor - 150 ft. candles (1,600 Lux) Immune to normal or artificial light

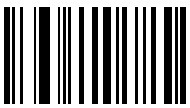
Appendix A Numeric Bar Codes

Numeric Bar Codes

For parameters requiring specific numeric values, scan the appropriately numbered bar code(s).

0

1



2

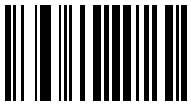
3

4

Numeric Bar Codes (continued)

5

6



7

8

9

Cancel

To correct an error or change a selection, scan the bar code below.

Cancel

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